In the outstanding Office Action, the drawings were objected to, although the proposed drawings filed on December 27, 2001, were approved. In addition, Claims 1, 3-7, 11, 12, 14, 16, 17, and 20-22 were rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 4,857,737 to Kamae et al. (hereinafter "the '737 patent"); Claims 2, 8, 9, 13, 15, 18, and 19 were rejected under 35 U.S.C. § 103(a) as being unpatentable over the '737 patent in view of U.S. Patent No. 5,793,045 to DiFilippo et al. (hereinafter "the '045 patent"); and Claim 10 was rejected under 35 U.S.C. § 103(a) as being unpatentable over the '737 patent in view of U.S. Patent No. 5,510,644 to Harris et al. (hereinafter "the '644 patent").

In response to the objection to the drawings, Applicants respectfully submit that a clean copy of the amended drawings was submitted with the Amendment of December 27, 2001. Accordingly, Applicants believe that the objection to the drawings has been overcome.

Applicants wish to thank the Examiner for the personal interview granted to Applicants' representations on July 15, 2002, at which time independent Claims 1, 12, and 14 were discussed and arguments in support of patentability were presented. However, no agreement was reached, pending the Examiner's further consideration of the claims upon formal submission of a response to the outstanding Office Action.

Amended Claim 1 is directed to a nuclear medicine diagnostic apparatus including: (1) at least one radiation detector, wherein each radiation detector includes a semiconductor cell array having a plurality of semiconductor cells arranged in a matrix; (2) a selection circuit configured to select two specific events; (3) a position calculation circuit configured to calculate an incidence position; (4) a counting circuit; and (5) a circuit configured to generate a distribution of radio-isotope in a subject. The selection circuit is configured to detect the specific event in which not less than two semiconductor cells in the semiconductor cell array output not less than two respective signals substantially simultaneously (recited in Claim 1 as

the *second case*). Moreover, in the second case, the position calculation circuit calculates an incident position of the radiation based on a position of *only one* of the not less than two semiconductor cells that output two respective signals substantially simultaneously. Note that Claim 1 has been amended for the purposes of clarification only, and that no new matter has been added.

The '737 patent is directed to a gamma ray detecting unit formed of a plurality of radiation detectors arranged in layers, as shown, for example, in Figures 1 and 2. Using energy and momentum conservation laws, the '737 detecting unit attempts to compute the reaction sequence and the scattering angle of multiple Compton scatterings within the detecting unit. However, Applicants submit that the '737 patent fails to disclose the position calculation circuit recited in Claim 1, which calculates an incidence position of the radiation based on a position of *only one* of the not less than two semiconductor cells that have signal outputs substantially simultaneously (in the second case). On the contrary, the '737 patent merely discloses that energy and momentum conservation laws can be used to compute the *scattering angles* at each detector layer as shown, for example, in Figure 2.[2] Note that the '737 patent fails to specifically disclose the case in which multiple semiconductor cells *in a single layer* output a signal, and further, how an incidence position would be calculated in such a case. Accordingly, Applicants respectfully traverse the rejection of Claim 1 (and dependent Claims 3-7 and 11) as anticipated by the '737 patent.

Amended Claim 12 is directed to a nuclear medical diagnostic apparatus including *inter alia*, a selection circuit that causes an event wherein not less than two semiconductor cells in the semiconductor cell array output not less than two respective signals substantially simultaneously, *not to contribute to imaging*. Regarding Claim 12, the Office Action asserts

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[2]See also column 8, lines 1-24 of the '737 patent.

that the '737 patent discloses (1) an event wherein at least two semiconductor cells output at least two signals simultaneously;[3] and (2) that the two signals detected substantially simultaneously do not contribute to imaging. However, the '737 patent merely discloses that the "chronological order of reactions is not directly detected."[4] Applicants respectfully submit that this statement is not equivalent to a teaching of detecting substantially simultaneous signals. Further, the Office Action indicates that the '737 patent discloses that the autocoincidence counter is used to exclude events, such as a N>2 scattering event, by determining if the detected energy is outside of a predetermined energy window.[5] However, the '737 patent does not exclude events from imaging based solely on the fact that not less than two cells output not less than two respective signals *substantially simultaneously*, rather on energy considerations only. Accordingly, Applicants respectfully traverse the rejection of Claim 12 as anticipated by the '737 patent.

Regarding the rejection of Claim 14, Applicants submit that the '737 patent fails to disclose the operation of the position calculation circuit in the second case. Regarding Claim 14, the Office Action indicates that the position calculation circuit is disclosed in the '737 patent at column 8, lines 1-24. However, the '737 patent merely discloses a formula for the calculation of the scattering angles based on the energy levels before and after scattering. The '737 fails to disclose the calculation of an *incidence position* based on the locations of the not less than two semiconductor cells that output the not less than two signals substantially simultaneously. Accordingly, Applicants respectfully traverse the rejection of Claim 14 (and dependent Claims 16 and 17) as being anticipated by the '737 patent.

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[3]Id., Column 6, lines 46-54.

[4]Id., Column 6, lines 51-52.

[5]Id., Column 9, lines 41-52.

Further, regarding Claim 16, Applicants submit that the '737 patent fails to disclose calculation of a barycentric position. The noted section of the '737 patent (column 8, lines 25-47) merely discloses the consideration of all possible scattering sequences given the number of scatterings.

Regarding the rejection of Claims 20 and 21 under 35 U.S.C. § 102(b), this rejection is rendered moot by the cancellation of Claims 20 and 21.

Amended Claim 22 recites limitations analogous to the limitations recited by amended Claim 1. Accordingly, for the reasons stated above for the patentability of Claim 1, Applicants respectfully traverse the rejection of Claim 22 as being anticipated by the '737 patent.

Regarding the rejection of Claims 2, 8, and 9 under 35 U.S.C. § 103(a), Applicants respectfully submit that the '045 patent does not cure the deficiencies of the '737 patent as discussed above for the patentability of Claim 1. Accordingly, Applicants respectfully submit that a *prima facie* case of obviousness has not been established and that the rejection of Claims 2, 8 and 9 should be withdrawn.

Further, regarding Claim 2, Applicants submit that the '045 patent fails to disclose the claimed internal coincidence circuit, but rather discloses the detection of coincidence among multiple detectors.

Regarding the rejection of Claims 13 and 15, which depend from independent 12 and 14 respectively, Applicants respectfully submit that the '045 patent does not cure the deficiencies of the '737 patent discussed above for the patentability of independent Claims 12 and 14. Accordingly, Applicants respectfully submit that a *prima facie* case of obviousness has not been established and that the rejection of Claims 13 and 15 should be withdrawn.

Finally, Applicants submit that the rejection of Claims 18 and 19 under 35 U.S.C. §

103(a) has been rendered moot by the cancellation of Claims 18 and 19.

Regarding the rejection of Claim 10 under 35 U.S.C. § 103(a), Applicants submit that the '644 patent does not cure the deficiencies of the '737 patent discussed above for the patentability of Claim 1. Accordingly, Applicants respectfully submit that a prima facie case of obviousness has not been established and that the rejection of Claim 10 should be withdrawn.

Thus, it is respectfully submitted that Claim 1 (and dependent Claims 2-11), Claim 12 (and dependent Claim 13), Claim 14 (and dependent Claims 15-17), and Claim 22 patentably define over the '737, '045, and '644 patents.

Consequently, in view of the present amendment and in light of the above discussions, the outstanding grounds for rejection are believed to have been overcome. The application as amended herewith is believed to be in condition for formal allowance. An early and favorable action to that effect is respectfully requested.

Respectfully submitted,

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IN THE CLAIMS

Claims 18-21 (Cancelled).

Please amend Claims 1-9, 12, 14, 15, 17, and 22 as follows:

1. (Amended) A nuclear medical diagnostic apparatus comprising:

at least one radiation detector, each radiation detector including a semiconductor cell array having a plurality of semiconductor cells [which] that (1) are arranged in a matrix, (2) detect radiation separately, and (3) output signals representing an energy of the radiation separately;

a selection circuit which, in order to select, among events wherein the radiation is detected, a specific event wherein radiation derived from a radio-isotope injected [to] into a subject is detected, in a first case wherein [either] only one of said semiconductor cells in the semiconductor cell array outputs [output] a signal, compares an energy of the signal with a predetermined energy window, and in a second case, wherein not less than two semiconductor cells in the semiconductor cell array output not less than two respective signals substantially simultaneously, calculates a total energy of the not less than two signals and compares the total energy with the predetermined energy window;

a position calculation circuit which, in the first case, calculates an incidence position of the radiation [on the basis of] based on a position of said semiconductor cell that [has] output the signal and, in the second case, calculates an incidence position of the radiation [on the basis of] based on a position of [either] only one [semiconductor cell among] of said not

less than two semiconductor cells;

a counting circuit configured to count the specific event in association with the calculated incidence position; and

a circuit configured to generate a distribution of radio-isotope in the subject on the basis of a counting result.

2. (Amended) An apparatus according to claim 1, further comprising an internal coincidence circuit configured to determine the second case on the basis of a time difference among a plurality of signals output from said at least one radiation detector.

3. (Amended) An apparatus according to claim 1, wherein, in the second case, said position calculation circuit compares the energies of the not less than two signals in order to select [either] only one [from] of said not less than two semiconductor cells.

4. (Amended) An apparatus according to claim 1, wherein, in the second case, said position calculation circuit selects, from said not less than two semiconductor cells, one semiconductor cell that outputs a signal representing a minimum energy.

5. (Amended) An apparatus according to claim 1, wherein, in the second case, said position calculation circuit selects [either] only one [from] of said not less than two semiconductor cells on the basis of the energy of the not less than two signals.

6. (Amended) An apparatus according to claim 1, wherein, in the second case, said position calculation circuit selects, from said not less than two semiconductor cells, one

semiconductor cell that outputs a signal representing a minimum energy in a first area, and one semiconductor cell that outputs a signal representing a maximum energy in a second area.

7. (Amended) An apparatus according to claim 1, wherein, in the second case, said position calculation circuit selects one semiconductor cell from said not less than two semiconductor cells on the basis of [the] an energy of the not less than two signals and the positions of said not less than two semiconductor cells.

8. (Amended) An apparatus according to claim 1, further comprising a circuit configured to calculate time differences between a signal output from [either] one of said plurality of semiconductor cells and signals output from remaining [ones] cells of said plurality of semiconductor cells.

9. (Amended) An apparatus according to claim 1, further comprising a circuit configured to calculate time differences between a signal output from [either] one of said plurality of semiconductor cells and signals output from remaining [ones] cells of said plurality of semiconductor cells, and determines the second case on the basis of the time differences.

12. (Amended) A nuclear medical diagnostic apparatus comprising:

at least one radiation detector, each radiation detector including a semiconductor cell array having a plurality of semiconductor cells [which] that (1) are arranged in a matrix, (2) detect radiation separately, and (3) output signals representing an energy of the radiation separately;

a selection circuit [which] that (1) causes, among events wherein the radiation is detected, an event wherein not less than two semiconductor cells in the semiconductor cell array output not less than two respective signals substantially simultaneously, not to contribute to imaging, and (2) selects an event derived from a radio-isotope injected [to] into a subject [on the basis of the] based on an energy of [the] a corresponding signal,

a position calculation circuit configured to calculate an incidence position of the radiation based on [on the basis of] positions of said semiconductor cells that output [the] signals;

a counting circuit configured to count the selected event in association [of] with the calculated incidence position; and

a circuit configured to generate a distribution of radio-isotope in the subject [on the basis of] based on a counting result.

14. (Amended) A nuclear medical diagnostic apparatus comprising:

at least one radiation detector, each radiation detector including a semiconductor cell array having a plurality of semiconductor cells [which] that (1) are arranged in a matrix, (2) detect radiation separately, and (3) output signals representing an energy of the radiation separately;

a position calculation circuit which, in a first case, wherein [either] only one of said semiconductor cells in the semiconductor cell array outputs a signal, calculates an incidence position of the radiation [on the basis of] based on a position of said semiconductor cell that outputs the signal and, in a second case, wherein not less than two semiconductor cells in the semiconductor cell array output not less than two respective signals substantially simultaneously, calculates an incidence position of the radiation [on the basis of] based on

positions of said not less than two [semiconductors] semiconductor cells that output the not less than two signals substantially simultaneously;

a counting circuit configured to count an event wherein radiation derived from a radio-isotope injected [to] into a subject is detected, in association with the calculated incidence position; and

a circuit configured to [generated] generate a distribution of the radio-isotope in the subject based on [the basis of] a counting result.

15. (Amended) An apparatus according to claim 14, further comprising an internal coincidence circuit configured to determine the second case based on [the basis of] a time difference among the plurality of signals output from said at least one radiation detector.

17. (Amended) An apparatus according to claim 14, wherein, in the second case, said position calculation circuit calculates, when said two semiconductor cells output signals substantially simultaneously, an incidence position on the basis of one of the positions of said two semiconductor cells, and when not less than three semiconductor cells output signals substantially simultaneously, a barycentric position of the positions of remaining [ones] cells of said plurality of semiconductor cells obtained by excluding said semiconductor cell that has output the signal having a maximum energy.

22. (Amended) A method for generating a distribution of a radio-isotope in [the] a subject with a nuclear medical diagnostic apparatus including at least one radiation detector, each radiation detector including a semiconductor cell array having a plurality of semiconductor cells arranged in a matrix, comprising:

detecting a radiation derived from the radio-isotope with [the] a semiconductor cell [which] that outputs a signal;

comparing an energy of the signal with a predetermined energy window in a first case wherein [either] only one of the semiconductor [cell] cells in the semiconductor cell array outputs a signal;

comparing, in a second case wherein not less than two semiconductor cells in the semiconductor cell array output signals, a total energy of the signals with a predetermined energy window [in a second case wherein not less than two semiconductor cells output signals]; and

calculating an incident position of the radiation based on [the basis of] a position of the semiconductor cell outputting the signal in the first case and based on [the basis of] a position of [either] only one of the semiconductor cells outputting signals in the second case.